



TITLE:

Influence of Slag especially of AlO and TiO in
Slag upon the Structure and Mechanical
Properties of Cast Iron. (IV)

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Combined nitrogen contained in the cast iron, especially nitrogen in HCl insoluble residue was found to increase conspicuously after 15 minute melting. To clarify this phenomenon, sample No. D-3-7 was treated according to the following conditions.

Melting temp. 1400°C
 Melting duration of time 60 min.
 Atmosphere air
 Cooling the sample is cooled to 1100°C. from 1400°C. in the first melting furnace, then quenched in water.

Those results show that the quantity of the combined nitrogen in the cast iron is as similar as in the original sample.

From the above mentioned results, we found that the cooling conditions likely affects some behaviors of combined nitrogen.

We admitted that the flaky graphite carbons in the cast iron became finer according to the chemical phenomena above mentioned.

59. Influence of Slag especially of Al_2O_3 and TiO_2 in Slag upon the Structure and Mechanical Properties of Cast Iron. (IV)

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The gray cast iron was melted under $\text{SiO}_2\text{-CaO-Al}_2\text{O}_3$ or $\text{SiO}_2\text{-CaO-Al}_2\text{O}_3\text{TiO}_2$ system slag at 1400°C., and cooled in various ways respectively as follows:

- a): quenched in water.
- b): cooled in air.
- c): cooled to room temperature from 500°C in furnace.
- d): cooled to room temperature from 1400°C in furnace.

Melting duration of time were 60 minutes at 1400°C.

Table 1. Chemical component of cast iron

C %	Si %	Mn %	P %	S %	Al %	Ti %
3.37	2.21	0.58	0.26	0.071	0.14	0.04

Table 2. Chemical composition of artificial slag.

Slag No.	SiO_2 %	CaO %	Al_2O_3 %	TiO_2 %	Total Fe %	Basicity
S-3'	41.36	44.60	8.52	0.14	1.35	1.08
S-4	34.02	49.86	8.34	8.35	—	1.46

Table 3. Experimental conditions.

Exp. No.	Original pig iron	Slag No.	Pig iron Slag	Decomp. Temp. °C	Melt. Time (min.)	Cooling condition
D-2-1	Cupola	S-3'	5/1	1400	60	(a)
D-2-2	◇	◇	◇	◇	◇	(b)
D-2-3	◇	◇	◇	◇	◇	(c)
D-2-4	◇	◇	◇	◇	◇	(d)
D-3-1	◇	S-4	◇	◇	◇	(c)
D-3-2	◇	◇	◇	◇	◇	(c)

Table 4 shows the results obtained (by these experiments). Combined Nitrogen contained in Cast Iron was decreased irrespective of Nitrogen in HCl soluble solution and HCl insoluble residue. And we find that the cooling conditions affect the denitrogenation. The influence of cooling condition had also been acknowledged from the results of the experiment with no slag in Report III.

Table 4

Exp. No.	N % in HCl soluble solution	N % in HCl insoluble residue	Total N %
Original Sample	0.0033	0.0081	0.0114
D-2-1	0.0008	0.0044	0.0052
D-2-2	0.0005	0.0027	0.0032
D-2-3	0.0026	0.0078	0.0104
D-2-4	0.0007	0.0076	0.0083
D-3-1	0.0028	0.0090	0.0120
D-3-2	0.0023	0.0089	0.0112

On the other hand, state of solidifying atmosphere should be regarded as to affect the cooling condition.

For the phenomena above mentioned, the investigations carried out by us are not sufficient to give a definite conclusion.

Flaky graphite carbons were found to become finer in our experiments.

60. Studies on the Cuprammonium Hydroxide Solution of Cellulose. (I)

On the Degradation of Cellulose in the Solution

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With a view of elucidating the phenomenon of the degradation of cellulose in